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ABSTRACT

The paper describes trends in student learning style preferences and identifies various characteristics of students associated with these preferences by examining data gathered from college students on three different occasions: at the time they entered college; at the end of their freshman year; and at the end of their sophomore year. By examining two-year longitudinal data from 2,175 students at 15 colleges and universities, the research found that: (1) most students entering college preferred regular class work and assignments, objective examinations, and discussions; (2) brighter students preferred assigned rather than independent work, objective rather than essay exams, and lectures rather than discussions; (3) during the first two years of college the trend in student learning style preferences was away from assigned work and objective examinations and toward more lectures and original research; and (4) the more able students changed preferences during the two-year period toward more traditional learning styles. References and tables are included. (Author/SES)

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Learning Style Preferences among College Students

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LEARNING STYLE PREFERENCES AMONG COLLEGE STUDENTS

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Abstract

By examining data gathered from college students on three different occasions (at the time they entered college, at the end of their freshman year, and at the end of their sophomore year), this paper describes trends in student learning style preferences and identifies various characteristics of students associated with these preferences.

LEARNING STYLE PREFERENCES AMONG COLLEGE STUDENTS

Each year thousands of college students are taught and evaluated in diverse ways on American college campuses. At the same institution different sections of the same course may seem to be unrelated in terms of the pedagogical or logistical procedures used by the instructor. One class section may be characterized by group discussion, independent study, original research projects and essay examinations, for example, while a different section of the same course, taught by a different instructor, may feature lectures, regularly-scheduled class assignments, little or no assignments requiring original research, objective examinations, and the like. Furthermore, it seems safe to say that such stylistic differences in approaches to teaching are primarily, if not exclusively, a function of varying predilections among instructors, generally having little or nothing to do with student preferences.

That this is so should hardly come as a surprise, for not much is known about student preferences for various styles of learning and the relationship between student preferences, actual classroom procedures, and the amount of learning that occurs. Though a good deal of research has been done on the educational and social effects of different instructional arrangements--research which shows either no differences (e.g., Dubin & Taveggia, 1968) or many differences (e.g., McKeachie, 1971) depending on the criteria one employs--such research has generally focused on overall effects without examining the interaction between instructional techniques and student preferences.

There would seem to be at least four basic questions about student learning style preferences that need to be answered: (1) what are student preferences for learning styles at the time they enter college, (2) what are the correlates of those preferences, (3) what changes occur in the style preferences, and (4) what is the relationship between student stylistic

preferences, instructor's technique employed, and subsequent student learning and level of satisfaction?

The purpose of this study was to answer the first three of these four questions. Drawing on a national sample of entering college freshmen and a follow-up of these same students one and two years later, data are presented that describe student learning style preferences, correlates of these preferences, changes that occurred in these preferences during two years of college, and correlates of these changes.

Procedure

Defining Learning Style Preferences

With the exception of data pertaining to students' academic aptitude (which was measured by the Scholastic Aptitude Test), all data in this study were taken from three different administrations of the College Student Questionnaires (CSQ).[1] Consisting of 200 questions dealing with student backgrounds, educational and vocational plans, attitudes, and the like, the CSQ also includes four questions dealing specifically with student preferences for learning styles, including organization of one's academic work, objective vs. essay examinations, lectures vs. discussion, and orientation toward doing original research. The four items, as worded in the CSQ, are as follows:

> Would you prefer to have your academic work organized to allow:
>
> 1. A predominance of class work, class assignments, regular examinations, etc.
> 2. A predominance of independent reading, writing, and research

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[1] There are two different forms of the CSQ. CSQ-1 is designed for students entering college and CSQ-2 for students who have been in college for one year or more. For details regarding the CSQ, see Peterson (1968).

In the average humanities or social science course, do you generally prefer:

1. Objective examinations (e.g., true-false, multiple choice)
2. Essay examinations

If class size permitted, which type of instruction would you prefer?

1. All or mostly lectures
2. All or mostly discussion

Do you generally like or dislike assignments requiring original research?

1. Dislike
2. Like

Samples

Data for this study were gathered at 15 colleges and universities in the fall of 1968, the spring of 1969, and the spring of 1970. These 15 institutions were chosen from a larger group which had readministered the CSQ to the same students at the end of the students' freshman and sophomore years in college. The analyses reported here are panel data, based on 2,175 students who completed two years of college. The 15 included several junior colleges (two public and one private), nine colleges awarding bachelor's and master's degrees (seven private and two public), and three universities (one private and two public).[2] The distribution of students in the sample attending these 15 institutions compares favorably with a national distribution of students attending higher educational institutions (with a slight overage in the sample for students from private, four-year institutions), but no claims are made that this is a perfectly representative national sample.

[2]The specific institutions include: Belmont Abbey (N.C.), Bridgewater (Va.), Carthage (Wis.), University of Delaware, Duke (N.C.), Eastern Illinois, Erskine (S.C.), Hiram (Ohio), Juniata (Pa.), University of Kansas, Macomb County Community College (Mich.), St. John's (Minn.), Shaw (N.C.), Tacoma Community College (Wash.), and West Georgia College.

From this basic sample of 2,175 students, various subsamples were drawn for certain analyses. For example, since SAT-V scores were obtained from other sources (possible since the CSQ includes the student's name), a 10 percent random sample of the students was used for certain correlational analyses. Similarly, since some of the analyses were performed with major field as a primary variable, only those students choosing one of three major fields with sufficient N's (natural science, social science, and humanities) were included. Specific information regarding the samples is included with each analysis.

Findings

The overall learning style preferences of entering freshmen, presented separately by sex, are included in Table 1. Here we see that, at the time they entered college, 59 percent preferred a traditional class procedure (i.e., class work, class assignments, regular examinations, etc.), whereas 41 percent leaned toward a procedure emphasizing independent study.[3] When it comes to student

[3] Two considerations are important to keep in mind in interpreting these data. First, these data pertain to entering freshmen who subsequently completed two or more years of college (to enable us to study changes in the preferences of the same students) and should not be confused with data for all entering freshmen. Second, entering student preferences in this regard can change dramatically over the years, and the reader is cautioned to remember that these data are reported for students who entered college in 1968 (again so that it would be possible to examine changes in student preferences during college). The comparison data booklet for the CSQ-1 published in 1966 indicates that 58% of the entering freshmen opted for assigned work and regular exams, whereas an updated comparison booklet published in 1971 reports only 46% of the students indicating the same preference. Furthermore, our own summary of data on the same question for students from 15 diverse institutions entering college in 1971 (data from three of the institutions were obtained in 1970) indicates that 45% prefer the traditional procedure. Preferences for the other three academic styles--objective vs. essay exams, lectures vs. discussions, and attitude toward original research--also change with time, but not nearly so dramatically. Of the 1971 students, 56% still prefer objective exams, 77% prefer discussions, and 52% favor original research.

evaluation, 62 percent preferred multiple-choice examinations as opposed to 38 percent preferring essay tests; 74 percent preferred a system which would permit all or mostly discussions as opposed to lectures in class, and 51 percent had a favorable attitude toward assignments requiring original research, as opposed to 49 percent who did not.

Insert Table 1 about here

Modest sex differences appear for the student preferences for objective examinations and the question of lectures vs. discussion. Fully two-thirds of the men in the sample preferred objective tests over essays, as opposed to 57 percent of the women indicating the same preference, and 78 percent of the men preferred discussions in class as opposed to 70 percent of the women. Students of both sexes, it appears, would rather talk about the subject in question, although a slightly greater percentage of women would rather listen to a presumed expert in the field talk about it. Conversely, though both men and women prefer objective examinations, a higher percentage of women than men would rather express themselves in writing when it comes to their evaluation.

What other background characteristics were associated with particular academic style preferences? An immediate characteristic that seemed relevant was academic aptitude: did the preferences of brighter students differ from those not so academically gifted? Other background factors that seemed to be relevant included the students' secondary school achievement pattern, educational aspirations, motivation for grades, and overall "orientation" (vocational, academic, collegiate, or nonconformist) toward college. With the exception of academic aptitude, data pertaining to these questions were available from

student responses to other questions of the CSQ. High school rank-in-class, high school grade average, and educational aspirations were all measured by means of single self-report items dealing with each topic. A student's motivation for grades was defined by his score on a 10-item scale included within the CSQ for that purpose. Finally, the student's overall orientation toward college was defined here by means of his preference for one of four paragraph descriptions (labelled in the CSQ as Philosophy A, B, C, and D), including the vocational, which emphasizes education essentially as preparation for an occupational future, the academic, which assigns greatest importance to interest in ideas and scholarly pursuit of knowledge, the collegiate, which emphasizes the importance of the extracurricular side of college life, and the nonconformist, which emphasizes individualistic interests and styles, concern for the personal identity and, often, contempt for many aspects of organized society. These four student orientations were originally advanced by Clark and Trow (1966) as different student "typologies," and are discussed in greater detail by Peterson (1965).

Data regarding students' academic aptitude were drawn from SAT records on file at Educational Testing Service. In view of the time and expense involved in obtaining these data, a 10 percent random sample of the students entering each of the 15 institutions included in the study was drawn for this analysis.

The relationship between these various background characteristics and the four learning style preferences among entering freshmen are presented in Table 2.

Insert Table 2 about here

These data indicate that academic aptitude, high school class rank and grade average, educational aspirations, and the student's motivation for grades tended to be positively correlated with the inclination to endorse what we might regard as rather traditional educational styles. For both sexes, brighter students, those who ranked toward the top of these high school classes and earned the better grade averages, those with higher educational aspirations and motivation for grades--these students rather consistently indicated a preference for assigned work over independent work, for objective examinations rather than essay exams, and for lectures rather than class discussions. (There are several exceptions to these generally positive correlations, however, as can be seen in Table 2.) The only consistent departure from the tendency for the "better" students to prefer the more traditional learning styles occurred with regard to original research, which the better students more strongly favored. Though these findings hold for both sexes, the relationships were generally stronger for males than females, particularly in the case of examination preferences.

The relationship between the student "orientations" (vocational, academic, collegiate or nonconformist) and learning style preferences were less consistent than the other background characteristics. Generally it appears that those who were vocationally oriented preferred the more traditional academic styles just as the brighter, high-achieving students did, but they also disliked doing original research. The academically oriented appeared to have some traditional stylistic preferences, some nontraditional ones, with a number of sex differences (e.g., academically oriented men liked doing original research, academically oriented women did not). Learning style preferences for those indicating a collegiate orientation did not appear to be consistent, and, with one exception, the correlations for the nonconformist group were all below .10.

The intercorrelations among the learning style preferences for those entering freshmen who chose a major field in science, social science or humanities are presented in Table 3. Of the 36 intercorrelations, 32 are in the positive direction and half are significant beyond the .05 confidence level, clearly indicating that preference for one learning style was associated with each of the other three stylistic preferences. Nevertheless most of the correlations were not high. Though the preferences were interrelated they were obviously not identical, not the same one worded four different ways.

Insert Table 3 about here

Changes in Academic Style Preferences

The first part of this paper considered student academic style preferences at the time students entered college--what the preferences were, how they were interrelated, and how they were related to other selected background characteristics of the students. Here the question of changes in academic style preferences will be considered.

In Figure 1 the basic change data for all 2,175 students are presented, by sex. In this figure it can be seen that both male and female students reported a decreasing preference for assigned work (over independent study) and objective examinations (as opposed to essays) during their first two years in college. The expressions of preference for objective examinations, in fact, were dramatically lower at the end of the sophomore year than when the students entered college, falling from 67 percent to 38 percent for men and from 57 percent to 32 percent for women. On the other hand, both sexes reported an increased preference for lectures (over discussion) and original research.

Insert Figure 1 about here

Data similar to that presented in Figure 1 but analyzed separately by major field are presented in Table 4. This table reports the percentage of students opting for the various academic styles who declared a major field in natural science, social science, or humanities, at the time they were freshmen, and who continued to declare the same major during the freshman and sophomore years. (Note that the three major field groups combined make up just under 40 percent of the total sample of 2,175. The others either declared no major field, or majored in some other field such as Business, Education, or Engineering.) These data permit more detailed analysis of the basic trend data presented in Figure 1. Specifically, it is clear that changes in student attitudes toward assigned (as opposed to independent) work were generally modest for students of both sexes and all three major field categories, with the exception of female social science majors, who reported a rather dramatic upswing in their preferences for independent work. Changes in attitudes toward objective examinations also appeared to be relatively unaffected by major field, with students of both sexes in all fields reporting a decreasing affinity for objective tests. Females were consistently less favorable toward objective examinations than males (as already suggested in Figure 1), and of the major field groupings the female humanities and social science majors entered college with the least favorable attitude toward objective tests and also reported the least favorable attitudes two years later. Interestingly, the shift away from a preference for objective tests was <u>smallest</u> over the two year period for male humanities majors, where the change was from 56 percent preferring objective exams when they entered college to 44 percent preferring objective examinations at the end of the sophomore year.

The Table 4 data pertaining to changes in attitudes toward lectures and class discussion are illuminating and important. Whereas the Figure 1 data indicated that there was an overall increase in student preferences for lectures during the first two years of college for both sexes, the opposite trend was reported by both male and female humanities majors. Male social science majors, who reported the greatest preference for discussion when they entered college (with 83 percent choosing this option), were characterized by the greatest shift toward preference for lectures (up to 33 percent) at the end of the sophomore year. In spite of the decreasing popularity of discussions for science and social science students, however, even for these students class discussions had more appeal than lectures at the end of the sophomore year.

Insert Table 4 about here

Finally, student attitudes toward doing original research became more positive for students of both sexes and all three major field categories, but was particularly pronounced for female students. Female science majors entered college with the smallest percentage liking original research (43 percent) and two years later fully two-thirds of this group had a favorable attitude toward this style of learning. Similarly, just over half of the female humanities majors liked doing original research when they entered college as opposed to 75 percent indicating a favorable attitude in this regard at the end of the sophomore year.

Having examined changes in student preferences for academic styles during the first two years of college, the next logical question seemed to be "What kinds of students change in what ways?" The data in Table 5 help to answer this question.

Insert Table 5 about here

With respect to the students' preferences for the organization of their academic work, those who changed (during the freshman year) from a preference for independent study to a preference for a more traditional procedure--when compared to those whose academic style preference changed in the opposite direction--were found to have higher SAT-V scores, higher high school grades and to attach more importance to getting good grades in college when they entered as freshmen. At the end of their freshman year these same students were found to have considerably higher first year grades and to be more satisfied with their grades.

Similarly, students who changed from a preference for essay examinations to a preference for objective tests--when compared to those changing from objective to essay--had higher SAT-V scores and high school grades and attached more importance to getting good grades in college when they entered, and also recorded slightly higher grades during their first year in college but were somewhat less satisfied with their academic performance.

These same comparisons can be made for students changing their preference for lectures and discussions and for those changing their attitudes toward doing original research. The basic conclusion one is led to is that those students whose preference changed from what might be regarded as a "new" to the "traditional" learning style preference (where regular assignments, objective examinations, lectures, and no original research represent the "traditional") were in every case students with higher aptitude scores, higher secondary school grades, students who regarded it as more important to obtain good grades in college and who, at least during their first year, actually did obtain better grades.

The data reported in Table 5 are even more interesting in view of the data presented earlier in Table 2 which indicated that, at the time these students

entered college, there were already generally positive correlations between what have been referred to here as "traditional" style preferences and similar academic variables.

How Many Academic Styles?

Earlier in this paper, brief attention was given to the question of the intercorrelations between the four learning style preferences being employed, and whether one general factor--say, traditional orientation versus an "independence" orientation--might not be operating. (The reader is referred again to Table 3.) It was apparent, however, that at least at the time they entered college, these four academic style preferences--though positively related--were not measuring one general stylistic orientation.

We would now like to return to this same question as it applies to student academic style preferences at the end of the sophomore year. In Table 6 the various intercorrelation matrices are again presented. Of the 36 possible comparisons--e.g., a comparison of the correlation between preference for assigned work and objective exams at the time of college entry and at the end of the sophomore year, etc.--28 of the correlations were higher for the data obtained at the end of the sophomore year. Clearly, then, the four learning style preferences are beginning to merge into one general academic style orientation. Nevertheless, the correlations are still sufficiently low in magnitude (even though 25 of the 36 are statistically "significant" at the .05 confidence level) that, with a simple "eyeballing" analysis, it is apparent that there is not just one factor operating.

Insert Table 6 about here

Summary and Conclusions

By examining two year longitudinal data from students at 15 colleges and universities, the research reported in this paper attempted to (1) describe the learning style preferences of entering college freshmen, (2) identify the various characteristics of students associated with the style preferences, (3) describe the changes which occurred in the style preferences, (4) relate the style preference changes to individual characteristics, and, finally, (5) present at least suggestive evidence that the various learning style preferences cannot be explained by means of one generalized preference factor.

Learning style preferences were measured by means of the College Student Questionnaires, and are defined in this research as a preference for one educational procedure from each of the following four pairs: "regular" classwork vs. independent study, objective vs. essay examinations, lectures vs. discussion, and like or dislike doing original research.

The major findings of the research can be summarized as follows:

(1) At the time they entered college most students of both sexes preferred academic work organized to allow a predominance of regular class work and assignments, objective examinations and mostly discussions. They appeared to be equally divided in their attitudes toward doing original research (Table 1).

(2) Students who entered college preferring assigned over independent work, objective over essay exams, lectures over discussions, and doing original research tended to be brighter students (as measured by the SAT-V), have higher secondary school grades and class ranks, and higher motivation for grades and educational aspirations (Table 2).

(3) During the first two years of college the trend in student learning style preferences was away from assigned work (in favor of independent study) and objective examinations (in favor of essay exams), and toward more lectures (as opposed to class discussions) and greater preference for assignments requiring original research. However, there were certain exceptions to these general trends, depending on the student's sex and declared major field of study (Figure 1 and Table 4).

(4) In terms of the characteristics of the students who changed their learning style preferences during their first two years in college, those whose preference changed from what might be regarded as a "new" to the "traditional" learning style (where regular assignments, objective exams, lectures, and a dislike for doing original research represent the traditional) were students with higher aptitude scores, higher high school grades, students who regarded it as more important to obtain good grades in college and who, at least during their first year, actually did obtain better grades (Table 5).

(5) Though the student preferences for learning styles were interrelated--and were more highly interrelated at the end of the sophomore year than at the time the students entered college--the style preference intercorrelations were not of sufficient magnitude to suggest that only one general academic style orientation can be used to explain the four preferences used throughout this research (Tables 3 and 6).

Some of these data would appear to call into question certain long-standing assumptions about students and their academic orientations. Perhaps the most surprising finding was that the more able students--as measured by aptitude measures and classroom performance--reported more traditional learning style preferences. And though there was a steady move toward preferences for less traditional styles during the first two years of college, it appeared to be the less able students whose learning style preferences were shifting in this direction.

Unfortunately, these data do not permit analysis of the next logical--and most important--question. What factors are related to student learning style preferences--and changes in these preferences--after they have been in college? Is the growing disenchantment with objective examinations, for example, related to a series of unfortunate experiences with such educational practices? Is the trend toward more lectures--as opposed to discussions--a sign of greater satisfaction with high quality lectures or, to take a dimmer view, a sign of increasing student unhappiness with unfruitful, leaderless, classroom rap sessions?

Another important question the data in this report do not help answer is "In what ways, if at all, are student learning style preferences related to the amount of learning that occurs in the class, how this material is retained, and how (and whether) it can be applied to new situations?" Criterion data of various kinds would be necessary in relating the different student preferences and instructional techniques to educational consequences. There is some evidence that these trait/treatment interactions are important, but the research done in this area is very skimpy. It does seem, for example, that

bright students (higher aptitude students) perform better in a small group discussion than students not as bright (Calvin, Hoffmann & Harden, 1957); that bright students' contacts with instructors are most meaningful if the contact involves exploration of new material, whereas less intelligent students' interaction with their instructors are more helpful if the time is used for clarification of points already covered (Siegel & Siegel, 1964); that more anxious elementary school students work most effectively in highly structured situations (Smith, Wood, Downer & Raygor, 1956); and that students high in need for achievement are more likely to succeed in courses involving a great deal of student responsibility for course procedures (Patton, 1955). Though these research findings are in need of replication with different samples of students in projects conducted on today's college students, their collective message seems to suggest that there is no single best instructional procedure or learning style but that, instead, the particular style is very much dependent on various learner characteristics.

In the long run, what would seem to be desirable would be a system in which it would be possible to offer students various options with respect to their styles of learning, hopefully to maximize their interest and subsequent learning that takes place. As McKeachie has suggested, "By specifying goals clearly and helping students think through their own learning skills and needs, the teacher should be able to improve student learning. With increasing knowledge, we should be better able to match means and ends, varying our procedures from day to day and student to student as our different goals move in and out of the spotlight (1971, p. 7)." Hopefully, this research is a small step in this direction.

References

Calvin, A. D., Hoffmann, F. K., & Harden, E. L. The effect of intelligence and social atmosphere on group problem solving behavior. Journal of Social Psychology, 1957, 45, 61-74.

Clark, B. R., & Trow, M. The organizational context. In T. M. Newcomb and E. K. Wilson (Eds.), College peer groups. Chicago: Aldine, 1966. Pp. 17-70.

Dubin, R., & Taveggia, T. C. The teaching-learning paradox. A comparative analysis of college teaching methods. Center for the Advanced Study of Educational Administration, University of Oregon, 1968.

McKeachie, W. J. Research on college teaching. Memo to the faculty, 44. From the Center for Research on Learning and Teaching, The University of Michigan, May, 1971.

Patton, J. A. A study of the effects of student acceptance of responsibility and motivation on course behavior. (Unpublished Ph.D. dissertation) University of Michigan, 1955.

Peterson, R. E. On a typology of college students. Research Bulletin 65-9. Princeton, N. J.: Educational Testing Service, 1965.

Peterson, R. E. Technical Manual, College Student Questionnaires. Princeton, N. J.: Educational Testing Service, 1968.

Siegel, L., & Siegel, L. The instructional Gestalt: A conceptual framework and design for educational research. A-V Communications Review, 1964, 12, 16-45.

Smith, D. E. P., Wood, R. L., Downer, J. W., & Raygor, A. L. Reading improvement as a function of student personality and teaching method. Journal of Educational Psychology, 1956, 47, 47-58.

Table 1

Learning Style Preferences of Entering Freshmen

	Female (N=1038)	Male (N=1137)	Total (N=2175)
	%	%	%
Prefer to have academic work organized to allow a predominance of:			
a) class work, class assignments, regular exams, etc.	60	57	59
b) independent reading, writing and research	40	43	41
In the average humanities or social science course generally prefer:			
a) objective examinations (e.g., true-false, multiple choice)	57	67	62
b) essay examinations	43	33	38
Class size permitting, would prefer:			
a) all or mostly lectures	30	22	26
b) all or mostly discussion	70	78	74
Attitude toward assignments requiring original research:			
a) dislike	51	48	49
b) like	49	52	51

Table 2

Correlations between Entering Freshmen Preferences for Learning Styles and Selected Background Characteristics

	Preference for Assigned over Independent Work		Preference for Objective over Essay Exams		Preference for Lectures over Discussion		Like Doing Original Research	
	F	M	F	M	F	M	F	M
SAT-Verbal	24	26	18	34	14	18	06	30
High School Rank-in-class	26	15	11	41	02	04	10	44
High School Grade Average	19	19	05	43	05	-01	03	43
Educational Aspirations	12	24	08	04	-03	-02	43	27
Motivation for Grades	05	20	10	20	02	11	13	25
Vocational Orientation	23	08	06	-01	18	10	-06	-10
Academic Orientation	-21	00	-15	07	17	-17	-26	25
Collegiate Orientation	07	-09	08	00	-24	03	20	-21
Nonconformist Orientation	-22	01	-09	-05	-01	03	01	10

Note.--These are product-moment correlations with decimals omitted. Correlations for females based on N=94; correlations for males based on N=104. These N's represent a 10 percent random sample of students entering each institution from which data were available (see footnote 1), minus those not answering certain items included in this table. SAT data were taken from records at Educational Testing Service. All other background characteristics data were self-reported information taken from the College Student Questionnaires.

Table 3

Intercorrelations among Learning Style Preferences for Entering Freshmen, by Sex and Choices of Major Field

	Natural Science[a]				Social Science				Humanities			
	1	2	3	4	1	2	3	4	1	2	3	4
1) Assigned/Independent Work	-	-13	17	15	-	36	03	44	-	14	25	24
2) Objective/Essay Exams	52	-	24	18	20	-	21	21	29	-	13	18
3) Lectures/Discussion	12	46	-	27	10	-02	-	-07	00	03	-	-03
4) Original Research: Like or not	45	32	16	-	31	34	08	-	37	26	-01	-
	N/Males = 231				N/Males = 146				N/Males = 74			
	N/Females = 113				N/Females = 118				N/Females = 175			

Note: These are biserial correlations with decimals omitted. Correlations for males are above the diagonal, for females below the diagonal.

[a]Includes biological science, physical science, and mathematics.

Table 4

Changes in Student Preferences for Various Learning Styles,

by Sex and Major Fields

	Percent of Males									Percent of Females								
	Science (N=100)			Social Science (N=80)			Humanities (N=33)			Science (N=47)			Social Science (N=62)			Humanities (N=94)		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
141. Prefer:																		
Assigned Work	53	46	41	41	41	42	48	47	45	39	41	41	56	45	35	47	46	41
Independent Work	47	54	59	59	59	58	52	53	55	61	59	59	44	55	65	53	34	59
142. Prefer:																		
Objective exams	70	54	43	51	43	31	56	41	44	60	36	33	50	47	31	48	38	27
Essay exams	30	46	57	49	57	69	44	59	56	40	64	67	50	53	69	52	62	73
143. Prefer:																		
Lectures	34	37	42	17	25	33	24	28	22	34	38	46	23	29	34	26	29	22
Discussion	66	63	58	83	75	67	76	72	78	66	62	54	77	71	66	74	71	78
144. Original Research:																		
Like	66	66	74	63	68	67	67	73	76	43	56	67	50	56	67	54	67	75
Dislike	34	34	26	37	32	33	33	27	24	57	44	33	50	44	33	46	33	25

Note.--1 = At beginning of freshman year
2 = At end of freshman year
3 = At end of sophomore year

Table 5

Characteristics of Students Changing Preferences for Learning Styles during Freshman Year

	N	Characteristics When Entering College: SAT-V (Means)	High School Grades (Means)[a]	Importance of Good Grades in College (Means)[b]	Characteristics at End of Freshman Year: First-year Grades (Means)[a]	Satisfaction with First-year Grades (Means)[c]
Organization of Academic Work --						
(1) Changed from preference for regular to independent	121	467	5.10	2.33	3.25	1.84
(2) Changed from preference for independent to regular	123	514	6.22	3.04	5.04	2.61
Preference for Examinations --						
(1) Changed from preference for objective to essay	125	491	5.44	2.28	4.28	2.46
(2) Changed from preference for essay to objective	111	504	5.64	2.91	4.36	2.27
Classroom Procedure --						
(1) Changed from preference for lectures to discussions	111	469	4.82	2.09	2.70	2.10
(2) Changed from preference for discussions to lectures	127	493	6.04	2.85	4.63	2.41
Attitude toward Original Research --						
(1) From dislike to like	125	458	4.80	2.72	4.04	2.57
(2) From like to dislike	121	498	6.52	3.00	4.33	2.33

[a] On a nine-point scale, where 9 = A and 1 = D+ or lower.

[b] On a four-point scale, where 4 = very important and 1 = not important.

[c] On a four-point scale, where 4 = very satisfied and 1 = very dissatisfied.

Table 6

Intercorrelations among Learning Style Preferences for Students Completing Two Years of College, by Sex and Choice of Major Field

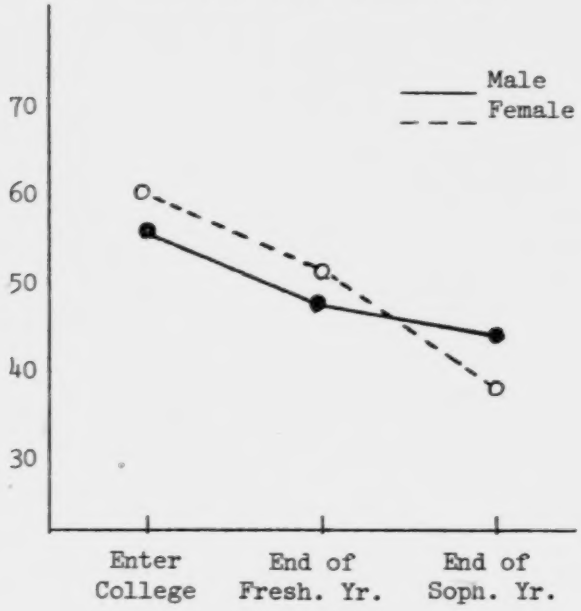
	Natural Science				Social Science				Humanities			
	1	2	3	4	1	2	3	4	1	2	3	4
1) Assigned/Independent Work	-	32	36	29	-	16	17	41	-	27	23	52
2) Objective/Essay Exams	63	-	32	25	27	-	08	22	27	-	33	35
3) Lectures/Discussion	16	29	-	04	33	03	-	23	54	26	-	18
4) Original Research: Like/Dislike	77	87	17	-	40	50	24	-	72	01	38	-
	N/Males = 109				N/Males = 87				N/Males = 41			
	N/Females = 52				N/Females = 69				N/Females = 110			

Note.--These are biserial correlations with decimals omitted. Correlations for males are given above the diagonal, for females below the diagonal.

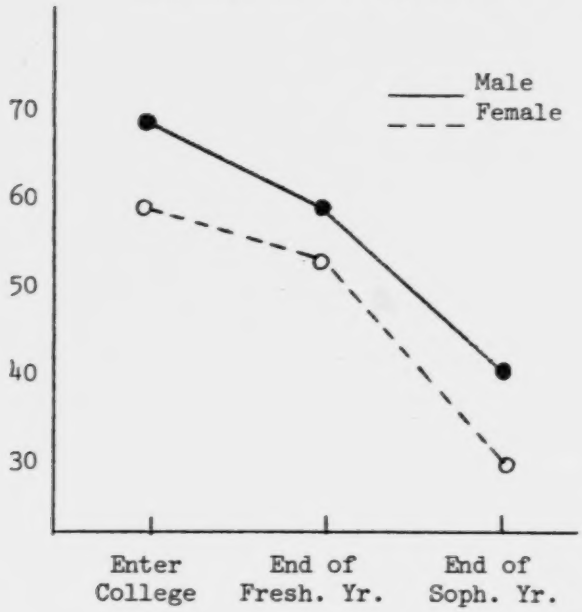
Figure Caption

Figure 1. Changes in student preferences for four academic styles during college.

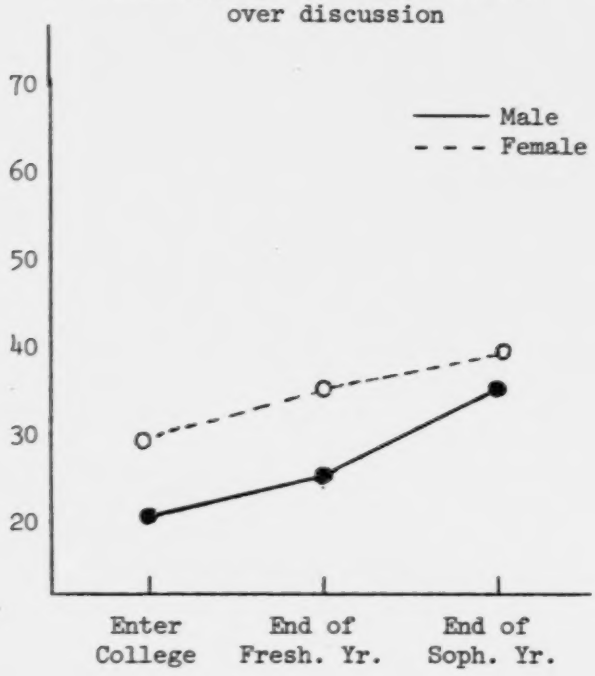
Percentage preferring assigned work over independent study



Percentage preferring objective over essay exams



Percentage preferring lectures over discussion



Percentage liking original research